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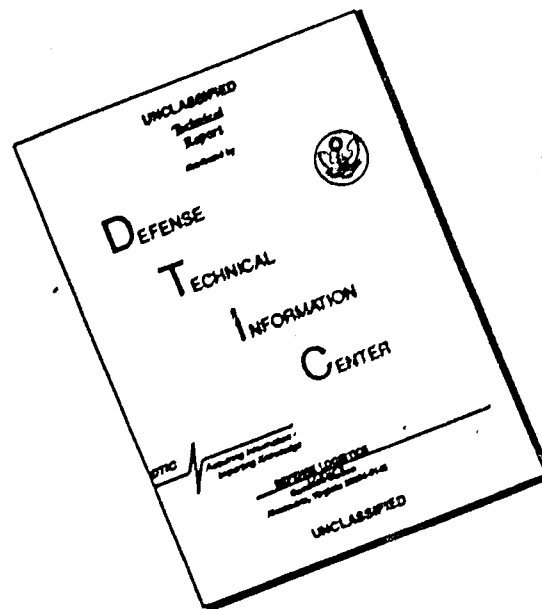
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WASHINGTON, D.C. 20310

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AGAM-P (M) (20 Aug 68) FOR OT RD 682074

23 August 1968

SUBJECT: Operational Report - Lessons Learned, Headquarters, 46th  
Engineer Battalion, Period Ending 30 April 1968

SEE DISTRIBUTION

1. Subject report is forwarded for review and evaluation in accordance with paragraph 5b, AR 525-15. Evaluations and corrective actions should be reported to ACSFOR OT RD, Operational Reports Branch, within 90 days of receipt of covering letter.
2. Information contained in this report is provided to insure that the Army realizes current benefits from lessons learned during recent operations.
3. To insure that the information provided through the Lessons Learned Program is readily available on a continuous basis, a cumulative Lessons Learned Index containing alphabetical listings of items appearing in the reports is compiled and distributed periodically. Recipients of the attached report are encouraged to recommend items from it for inclusion in the Index by completing and returning the self-addressed form provided at the end of this report.

BY ORDER OF THE SECRETARY OF THE ARMY:

1 Incl  
as

*Kenneth G. Wickham*

KENNETH G. WICKHAM  
Major General, USA  
The Adjutant General

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DEPARTMENT OF THE ARMY  
HEADQUARTERS, 46TH ENGINEER BATTALION  
APO 96491

EGBB-CO

14 MAY 1968

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for Quarterly  
Period Ending 30 April 1968

THRU: Commanding Officer, 159th Engineer Group, APO 96491  
Commanding Officer, 20th Engineer Brigade, ATTN: AVBI-OPN  
APO 96491  
Commanding General, United States Army, Vietnam, ATTN: AVGC-DH,  
APO 96375  
Commander in Chief, United States Army, Pacific, ATTN: GPOP-OT,  
APO 96588

TO: Assistant Chief of Staff for Force Development  
Department of the Army (ACSFOR DA)  
Washington, D.C. 20310

1. Section 1, Operations: Significant Activities.

a. Command: LTC George B. Gray Jr, commanded the battalion during the entire reporting period.

b. Headquarters Company conducted the following activities during this period.

(1) The utilities section put into operation a 3,000 gallon per hour water purification unit. This unit has purified over 1 1/4 million gallons since being put into service.

(2) Besides its normal repair work, the utilities section completed work on a combination utilities-sign painting shop. The building was a standard 20 x 100 ft tropical building with wooden floor. The project included a concrete block retaining wall.

(3) The sign shop has produced many signs during the period. The most pretentious was an artistic double faced 8 x 8 ft USARV Helipad sign with raised lettering and unit crests.

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(4) During the past month area beautification has been of concern. Flowers and trees have been planted throughout the battalion area.

c. Company A conducted the following activities during this period.

(1) Company A continued with routine 3rd echelon maintenance. The average deadline of the battalion decreased slightly, primarily due to the increased availability of repair parts and also because of increased emphasis placed upon operator maintenance practices. Increased responsiveness of high priority requisitioning processes has also aided this unit's maintenance position.

(2) In addition to its regularly scheduled maintenance, the Battalion Maintenance Section of A Company has been required to provide limited 3rd echelon ordnance support for the battalion since combat ordnance equipment has continued to enjoy a higher work priority at the Support Unit.

(3) During the beginning of the period, increasing demands for crushed rock in the area necessitated A Company Maintenance Support to the rock quarry facility in Bien Hoa. The Engineer Direct Support Platoon of A Company performed 3rd, 4th, and 5th echelon repairs on one 75 ton Jaw Crusher, Model 5157, three 75 ton per hour Eagle Roll Crushers, seven 300 ton per hour conveyor belts and one crusher roll box assembly. A total of 1140 man hours were expended on this project.

(4) In order to increase the battalion's capability to produce concrete blocks, the welding and machine section was tasked with the job of fabricating a prototype block making machine of Korean design. After several attempts to modify the original plan it was decided that the machine would not sufficiently increase block production to warrant manufacturing them in quantity. As a result, the welding shop manufactured seven other machines similar in design to those in use already. These machines are in use at the present time in the Battalion Block Shop. The welding and machine shop fabricated diaphragms, steel rollers, stiffener plates, bearing plates and steel pins for the Bear Cat Bridge when it became known that these parts were not available through normal supply channels.

(5) The Equipment Support Platoon of A Company took over the task of logistical support to Task Force Builder. Sixty, 5 ton dumps were provided by this unit to transport prefabricated materials and domestic supplies to the Task Force. In addition 29 tractor and trailers transported 540 tons of lumber and concrete blocks to the Delta.

(6) Towards the middle of the reporting period, the Equipment Platoon of A Company was issued an experimental sand bag filling machine. The platoon was given the assignment of conducting a 60 day test program to determine the usefulness of the device. Although the test has not been completed during this reporting period, statistics so far indicate that several modifications will be required.

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(7) Elements of the Equipment Platoon completed work on the Battalion wash point during the period. The facility was designed to handle six vehicles simultaneously. In order to accomplish this project, located at a nearby flooded quarry site, a diversion channel and a simple check dam were constructed to insure constant water level.

(8) The asphalt section completed surface treatment work on 60,000 square yards of storage space at the new 185th Battalion maintenance location. The project took 4 days and was completed on 24 April.

(9) Entrenching support was provided for Field Force II in Long An Province on 20 April, where 900 meters of one and one half by six feet deep trench was needed as a hasty perimeter defense position. The project was completed on 28 April. Entrenching Machine Support was also provided by this unit to the 79th Engineer Group. This project consisted of emplacing 6,000 feet of communications trench near Quan Loi.

d. Company B conducted the following activities during this quarter.

(1) As a result of the TET Offensive in Vietnam, the first month of the preceding quarter was devoted primarily to the construction of protective and defensive type bunkers by "B" Company for Long Binh Post. The First and Second Construction Platoons, working jointly, erected seventeen wood paneled, earth filled mortar bunkers for the USARV BOQ area. The finished bunkers have a total housing capacity of 340 men and afford minimal protection against a direct hit from a mortar round.

(2) Upon completion of the USARV bunkers, the combined efforts of the two construction platoons were directed to the erection of thirteen wood reveted fighting bunkers on the perimeter of Long Binh Post. These perimeter bunkers were ten feet square and consisted of a wood paneled frame with overhead cover. After "on site" erection of the wood panels and roof, a bulldozer was used to push earth berms against the four sides of the bunker. The earth berms were then peneprimed to prevent erosion. This bunker is designed to offer protection from small arms, mortar, and anti-tank rocket fire.

(3) The First Construction Platoon also erected two 12-man reaction force bunkers and a twenty foot observation tower behind the perimeter bunkers on Long Binh. These 12-man bunkers consisted of earth filled wooden walls and a column supported, earth filled roof. Personnel within the bunkers were afforded visibility to all sides. The tower was built on concrete footers with a sand bagged observation post on top.

(4) Throughout the reporting period the Company B Carpenter Shop prefabricated four-hundred bunkers of various types and sizes for the many units at Long Binh, thus significantly contributing to the protection and defense of the personnel stationed there.



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(5) In early February the company was alerted for a possible road maintenance mission on highway QL-20. Since the assignment of this mission required that the company move to and establish a base of operations approximately one-hundred miles from Long Binh, extensive preparations were made. Necessary supplies were drawn, equipment brought to a high state of readiness, and three days of intensive classes were held for all unit personnel in preparation for the move. This mission was and has remained deferred up to the present time.

(6) On 5 March 1968 the First Construction Platoon began the erection and filling of 1100 linear feet of 10½ foot high, wood paneled, earth filled revetments and 340 linear feet of 4½ and 5½ foot high revetments for the protection of the generator complex at the Long Binh Post electric plant. The revetments were designed to protect the generators and transformers from fragmentation damage during mortar attacks.

(7) The Second Construction Platoon completed the construction of two 40 foot by 50 foot battalion headquarters buildings in the II FFV cantonment area. The headquarters for the 53rd Signal Battalion was completed on 17 March 1968. The building is a prefabricated metal composite, built from two 20 foot by 50 foot "Industrial Metal" buildings. It has 2000 square feet of floor space divided by interior partitions to make six rooms. The exterior walls and the drop ceiling of the building were insulated with 3 inch fiber glass block, while the interior partitions, as well as the ceilings and walls, were paneled with ½ inch plywood and finished with ¼ inch by two inch stripping to produce a very attractive interior. Two air conditioners, provided by the using unit, were installed in the building.

(8) The battalion headquarters building for the 303rd Radio Research unit was begun on 14 March 1968 and was completed on 28 April 1968. The design of the 303rd RRU building was identical to that of the 53rd Signal building except for the placement of interior partitions. The 40 foot by 50 foot room was partitioned into five offices. Air conditioners were not installed, although, outlets and wall openings were placed for installation of air conditioners at a later date.

(9) Construction was initiated on 22 February 1968 on the Minimum Essential Requirements for the 5/12 Infantry. The work was planned as a company project in order to meet the requirement date of 25 April 1968. The earth moving portion consisted of a 250 yard by 400 yard laterite pad for the motor pool, 750 linear feet of road and 13 laterite pads for the latrines, showers and water towers. The Second Construction Platoon erected five latrines, five showers, and three 3000 gallon water towers. The First Construction Platoon installed the plumbing and placed a 40 foot by 150 foot concrete scullery pad.

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(10) The Second Construction Platoon, in conjunction with personnel from the B Company Carpenter Shop, is presently involved in the expansion of the Carpenter Shop facilities. A 30 foot by 96 foot open bay building was constructed to house the Cabinet Shop. A 30 foot by 200 foot platform was constructed between the two existing Carpenter Shop buildings and roofing of this platform is now in progress. This construction will provide the Carpenter Shop with 6000 square feet of additional work space.

(11) The Earth Moving Platoon continued work on 3.4 kilometers of the Bear Cat to Mallard Combat Essential Road, hauling, placing, compacting and grading 78,260 cubic yards of laterite during this time period.

(12) The earth moving crew (night) placed 127,400 cubic yards of laterite in support of the 169th Engineer Battalion's 506th Field Depot storage area project.

(13) The Company B Carpenter Shop has completed during the quarterly period, the following significant tasks:

- (a) Prefabrication of 400 protective and defensive bunkers.
- (b) Prefabrication of trusses, doors, windows, school desks student chairs, and other items for the Revolutionary Development Program in the Mekong Delta.
- (c) Prefabrication of ninety shower and latrine units.
- (d) Prefabrication of forty temporary huts for Vietnamese.
- (e) Prefabrication of 3000 linear feet of various type revetments

e. Company C conducted the following significant activities during this period.

(1) Company "C" continued horizontal and vertical construction on the II Field Forces Aviation Facilities, Phases I, II, and III. Horizontally, over 25,000 cubic yards of laterite were hauled in the construction of 3 helipads, 10 refueling pads, a Chinook pad and an access road. Work was completed on 60 revetments, 30 steel and 30 wooden, for the 17th AHC and the 195th AHC. 15 additional wooden revetments were constructed at the 25th Aviation MSR Facility. These wooden revetments were constructed of prefabricated forms made in the Battalion Carpenter Shop. They were then filled with laterite and penepripped to insure long use in this tropical climate. Vertical efforts were further expended in the construction of 325 linear feet of wooden revetments at the VIP Helipad at II FFV. A 185' revetment wall was built along the length of the VIP pad in addition to 2 individual L-shape revetments. Work continued on the construction of concrete block headwalls throughout the II FFV Helipad Facilities area.

(2) Two major mortar-bunker projects were undertaken by the vertical platoons during this quarter. Eighteen laterite filled mortar bunkers designed for 20 men each were built of prefabricated walls, culvert, tie wire, and laterite for the USARV BOQ area. These bunkers were designed with 2' wide walls, and end blast walls to provide maximum protection from fragmentation and minimal protection from direct hits. Seats and boardwalk provide comfort inside. Thirty-six 24 man bunkers were constructed for the Saigon Support Command. These bunkers used the same construction materials but were designed using a double row of culvert for its roof. This technique enabled the

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bunkers to be constructed in shorter lengths and with less expenditures of material and manpower.

(3) Near the beginning of the quarter, work was begun on a 30' x 76' maintenance building for the 7th Transportation Battalion. This two story, four-bay building was constructed of prefabricated side panels, posts, and trusses. Vietnamese carpenters completed a majority of the actual construction in a highly professional manner. Vietnamese also assisted in the extensive electrical wiring of the building.

(4) An experimental billets was constructed early in the quarter for the USARV Billeting area. The building was constructed of concrete block, wood frame, and galvanized metal siding and roofing. The use of concrete blocks rather than sandbags minimized the construction time and produced an equally effective mortar fragment protective wall for occupants.

(5) Trailer Court #6 entailed the leveling and blocking of 28 house trailers in the USARV BOQ area. Once leveled, plumbing was tied into an underground plumbing system installed by civilian contractors. Twenty-eight power-line poles were installed for the eventual hook-up of electrical wiring to the larger, commercial lines. The installation of 58 sets of stairs and 3,760 linear feet of duck board completed the project.

(6) The vertical construction effort of Company "C" expanded into the field of bridging during this quarter. A critical part of the Bear Cat to Mallard Road was the crossing of a 100' span in Company "C"'s assigned area of the road. A 28' x 100' double span, steel I-beam bridge was constructed during this quarter. A 20 ton crane with a pile driving rig drove a total of 32 H-piles in one pier and two abutments. Welders then installed 3 pile caps, 8 stringers, 21 diaphragms, and 4" x 12" treadway composed the traveled way, and sidewalks with hand rails were added for pedestrian traffic.

(7) In order to prepare for the construction of a 60' simple span, steel I-beam on LTL25 near Cat Lai, Company "C" removed a 100' Double-Single Bailey Bridge from the site. The 617th Engr Co (FB) provided technical assistance in the extraction and disassembly of the bridge. The parts were returned to Long Binh Post for salvage or disposal. A bypass consisting of two rock filled causeways and a Bailey Bridge were first constructed to provide a continuous and smooth flow of traffic.

(8) Horizontal efforts continued on the Bear Cat to Mallard Road during the quarter. Company "C"'s assigned, 3/4 mile length of road required the clearing of 40 acres of jungle and the hauling of over 54,000 cubic yards of laterite. Extensive blasting was required to reduce an extremely rocky portion of the road to grade.

(9) The 3/4 mile long 48th TC Road connected the 48th TC with a main traffic artery, QL15 at Long Binh. 14,089 cubic yards of laterite have been hauled to fill the largely swampy area of the road. 180' of 72" culvert were installed in three sections to insure proper drainage.

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(10) An additional project during the quarter was the construction of the EOD Road to the EOD pit, east of Long Binh Post. The 30' x 3,000 meter road required 8,618 cubic yards of laterite and four 48" culverts with sand-bag headwalls.

f. Company D conducted the following activities during this period.

(1) As a result of the Lunar New Year Offensive, almost all of D company's assigned projects were halted from 1 Feb 68 thru 1 Mar 68. During this period the combined efforts of the two vertical platoons was channeled to construction fortification in the Long Binh area. At the USARV BOQs, 19 wooden prefab earth fill bunkers were laid out and assembled on site to provide mortar fire protection for personnel living in that area. At the 29th General Support Group perimeter defense sector, 7 wooden prefabricated earth guard bunkers were constructed along with two wooden prefabricated reaction bunkers. Also during this quarter work began on the battalion operations center. A 30 foot tower was included to allow increased observation. A 50 cal. machinegun and a starlite scope were installed on the tower. A 4,200 gallon water tank was installed from elevation 20 feet to 30 feet for the BOQ shower.

(2) Construction of a temporary TOC for the 1st Log Command was started and completed during this quarter. A 21' x 51' x 15' deep excavation was required in a restricted area. The bunker is constructed of heavy timbers with a blast cover of one layer of 12" x 12" timbers, 1 foot reinforced concrete and 2' compacted soil. All exposed areas were covered with roofing felt and sprayed with penepime before backfilling with soil. Completed, the bunker has 604 square feet of working floor space and is completely plywood paneled with stripping. Ventilation is provided by a 36" drop culvert and circulating fans. Access is through an above ground structure with 3' thick blast walls. The exterior of the access building is covered with a tin siding similar to the surrounding buildings and painted to match. Emergency entry and exit can be made through the air duct. Two banks of 9 each fluorescent lamps provide lighting and there are 20 outlets for electrical equipment.

(3) Construction of the 46th Engr Bn Chapel was begun this past quarter, featuring rigid frame construction with a 30' free span. The altar and choir area are paneled with grooved plywood. A new innovation for military chapels in Vietnam will be introduced on this structure. Stained glass windows, donated by men in the battalion, will be integrated into the standard design and installed in the chapel sides. Vietnamese carpenters are being extensively utilized on this project.

(4) A 10' high platform was constructed by one squad from this unit to support a 3 ton portable air traffic control tower at the USARV Helipad. The module was set in place on the platform on the 2nd day of construction. The whole structure was then enclosed to provide generator and equipment storage. A staircase was built and then the tower was painted white with 30' horizontal red fluorescent stripes.

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(5) Currently the earthmoving platoon is placing the final laterite cap, constructing drainage ditches and installing culverts on a 5,400 meter segment of the road connecting Long Binh with Bear Cat. 235,000 sq yds of fill were placed on the road this quarter. During the past quarter the earthmoving platoon completed clearing the 200 meter right of way, constructed the 34' MACV Standard roadway, less final cap, and constructed a complete drainage system.

(6) In addition, D Company completed the enormous task of burying 125,000 damaged penneprime barrels at the LBP 208 yard. A 20' x 250' x 250' hole was excavated. The barrels were placed in the hole and crushed. A hardstand was placed over the excavation site. Also four additional helipads at the USARV Heliport were constructed and D Company supported C Company in clearing 650 acres of jungle for the FOD pit road.

g. On 1 January 1968, the 103rd Engineer Company (CS) was attached to the 46th Engineer Battalion and is located on Long Binh Post. The following activities were conducted by the 103rd Engineer Company during this period.

(1) Combat Support Operations: All combat support operations of the 103rd Engineer Company (CS) have been limited to the dispatching of two ten ton tractors with 60 ton trailers to the 86th Engr Bn for six days.

(2) Construction Support Operations: By the very nature of the mission of the 103rd Engineer Company (CS), its construction support effort has been directed toward the support of the 159th Engineer Group with asphalt and quarry operations. These operations, on a two shift basis, have limited the capability of the equipment platoon to provide support to other units within the 159th Engineer Group. The equipment platoon has furnished dozer support to the 62nd Engr Bn laterite pit and to the 46th Engr Bn for the 208 yard repair. In addition the Euclid platoon has been called upon to provide support on numerous occasions where large volumes of fill were required to be hauled. 200M tractors have been utilized by the 46th Engr Bn in support of the 506th Field Depot projects and other earthmoving projects.

(3) Asphalt Operations: At the beginning of the reporting period the 103 Engr Co (CS) produced asphalt in two standard military 80-120 ton per hr Barber Green continuous mix asphalt plants, on a one shift basis, in support of the 169th Engr Bn paving operation. On 16 April 1968, the plants went on two shift operation in order to increase the output of the plants to approximately 2,000 tons per day.

(4) Accumulative data during the period is:

- (a) Tons Mix produced - 40,780
- (b) Gallons AP-3 used - 529,538
- (c) Aggregate 3/4" (-) cy used - 8,684
- (d) Aggregate 1/4" (-) cy used - 12,823

(5) The 103d Engr Co (CS) Quarry Section was detached from the company on 17 December 1968 and attached to Task Force Quarry under control of the 46th Engr Bn. The Quarry Section is located at the Bien Hoa Air Force Base. The Quarry Section was reattached to the 103d Engr Co (CS) on 15 March 1968 and remains under operational control of the 103d Engr Co (CS) at the present time. Total production for the report period was 18,746 cubic yards.



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h. Task Force Builder conducted the following activities during this period.

(1) Work continued on the Revolutionary Development Program in Long An Province, Vietnam. The FY 67 program was completed. It consisted of a 4 room school with teacher's house, a 3 room school with teacher's house, a 2 room school, a maternity dispensary, a hamlet office, a hamlet bridge, and the foundation for a teacher's house. The FY 68 program was started and progressed steadily except during the TET offensive in early February. The FY 68 program consists of a 5 room school with teachers house, 3 four room schools, 3 three room schools one with a teacher's house, a separate teacher's house, a market place and a maternity dispensary. Five of ten sites were substantially completed during this quarter.

(2) Task Force Builder increased its horizontal effort during this quarter. Construction of building pads for the FY 68 program utilized both laterite pads and local rice paddy material stabilized with approximately 10% dehydrated lime. Additionally, the Task Force performed road maintenance and repair in support of the Revolutionary Development Program. Currently 6 separate horizontal tasks have been approved, and work has started.

(3) The Revolutionary Development Program generated much enthusiasm and interest among the inhabitants of Rach Kien and surrounding villages. The school at Cau Tram was put into use immediately upon completion and is staffed by 3 teachers and a headmaster. Also one maternity hospital was immediately put into use with a mid-wife in charge. In the village of Rach Kien local inhabitants have established a concrete block shop and carpenter prefabrication shop. Technical advice is provided by Task Force Builder personnel. The local inhabitants have become more active in defending their houses and hamlets. Bunkers have been constructed by the villagers with technical assistance provided by Task Force Builder.

(4) The Task Force continued to receive periodic mortar attacks on the base camp. The living bunkers proved their worth as only five minor wounds were sustained during 12 mortar attacks with more than 250 rounds. The work day continues to be limited (0800-1700) due to security requirements. At the beginning of TET all construction on RDS projects was suspended for approximately one week at the request of the District Chief. During this period Task Force effort was diverted to civil action support in Rach Kien and rehabilitation of bunkers and shelters occupied by US units. In addition, a 20 x 60 aid station bunker was built for an infantry battalion located at Rach Kien.

i. Personnel, Administration, Morale, and Discipline:

(1) The 46th Engineer Battalion is organized under TO&E 5-115E. The 103rd Engineer Company (Construction Support) organized under TO&E 5-114D, was attached by 159th Engineer Group General Order no 34, effective 1 January 1968. (see Incl 1).

(2) The Vietnamese continue to be employed in a variety of skills within the battalion. The most significant observation was the increase in

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skilled labor in B Company Carpenter Shop, the largest pre-fabrication shop in Vietnam.

(3) Personnel: The battalion has had a total of 1,065 men processed either in or out of the battalion. This is broken down into 594 losses and 571 gains over the quarter ending 30 April 1968. The rotational hump for the next three months will not exceed 15% in any one month. (The rotational rates are forecast as 9% for May, 6% for June, and 6% for July).

(4) Morale and welfare: Morale has kept its steady pace upward this past quarter. This can be attributed to many factors. All of the battalion's personnel in the Long Binh area live in tropical frame buildings. A central water distribution system has been completed for all showers and mess halls to provide hot and potable water. The battalion was well represented in the softball league. A snack bar was opened in the battalion area last quarter and we have added a soft drink and snack stand at the asphalt plant and also have a completely new idea in a mobile snack bar that goes from job to job with an experienced mechanic to help the operators with maintenance and a Vietnamese girl that runs the snack bar. The awards program has been greatly emphasized over the past quarter and we had a total of 149 medals presented in this battalion between 1 February and 30 April 1968. The battalion's effort is continuing to be expended off of Long Binh Post. Personnel have a greater sense of accomplishment while working in outlying areas and on Revolutionary Development Projects in the Mekong Delta. The men of the battalion are extremely eager to participate in those projects involving contact with the enemy. Their morale has risen remarkably when they are committed to projects which have a sense of urgency and place them where the action is. A further indication of the morale is the fact that a total of 97 extensions were approved over the period and as of the end of the reporting period the battalion had a total of 254 men in the battalion that are presently on extension.

j. Intelligence and Counter Intelligence: The battalion continued to disseminate intelligence information during the weekly briefings. During periods of intensified Viet Cong action, these briefings were held daily. The weekly briefings summarized all the intelligence information obtained during the preceding week.

k. Logistics: During the past quarter, the initiation of the TET offensive affected the lumber distribution. With an emphasis on bunkers and revetments the issue per month rose from an average per month of 400,000 BF last quarter to an average per month of 700,000 BF during the recent quarter. Specific sizes of lumber became prominent on the critical shortage list with the most critical being 2x12, 4x4, 4x6, and 4x8 which were used for bunker construction. The major problem has been that the depot source of supply has not been able to meet demands as rapidly as they occur.

The TO&E equipment status has improved considerably over the last reporting quarter. This quarter, the fill of major items of equipment was 94% as compared to the 87% reported during the previous quarter. However, there still are shortages of several critical items of TO&E equipment. Potable water

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production and transportation remain a serious problem. The battalion is authorized two each 1500 gal per hour exhalators and has none on hand. It is authorized six each 1000 gal water distributors and currently has only four.

Air compressors are a problem in that of the seven 250 cfm air compressors authorized none are on hand. Although 600 cfm air compressors are on hand in lieu of the 250 cfm air compressors, their age and limited capabilities have restricted their actual worth.

The battalion is authorized 26 each 10 ton truck tractors and 3 each 5 ton tractors. Only 4 of the 10 ton tractors have been received and 2 more are pending approval for a lateral transfer. Nine 5 ton truck tractors have been issued in lieu of the 10 ton tractors. Consequently, the total of only 15 out of 29 authorized vehicles has limited the hauling and transporting capabilities. The two authorized 10 ton crawler cranes are not on hand.

The receipt of a new forklift increased the production capability of the carpenter shop. Nine new Letourneau Westinghouse graders were received, as were three new front loaders.

l. Force Development: The work force of the battalion was further augmented by additions to the authorized Vietnamese work force. During this period, an additional 160 temporary hire carpenters for the carpenter shop and an additional 50 temporary hire masons for the block shop were approved. A request to convert these spaces to permanent hire was submitted during April. In order to provide efficient working space for the new carpenter personnel, additional floor space was made available by erecting a roof between the two existing buildings and laying a floor. The block shop now has twenty block machines and employs over 100 Vietnamese. The production capability of this plant is approximately 1400 blocks a day.

English classes are being conducted by battalion personnel for the Vietnamese supervisory personnel. Classes emphasize words and phrases pertaining to their work. Participation is enthusiastic. It is felt that beneficial results will be realized during the next quarter.

m. ARVN Civil Recovery Program, 5th and 30th ARVN Engineer Groups.

(1) The dependent housing area of the 5th and 30th ARVN Engineer Groups were destroyed during the TET offensive in early February 1968. Engineer assistance was provided to assist in the rebuilding of the housing area. Technical assistance was furnished to assist in setting up a concrete block plant, a prefabrication carpentry shop and adapting building designs to prefabrication techniques. Non-critical construction materials were furnished under this program. The battalion donated rice and clothing to the 5th and 30th Engineer Groups under the Civic Action Program.

n. Civic Action: The battalion civic action program was active as a result of the TET offensive. Scrap lumber was contributed to many of our employees whose homes were damaged or destroyed during TET. The 46th Engineer Battalion was responsible for helping 32 families of the ARVN Engineer Battalion at Hoc Mon to rebuild and restock their homes. Men of the battalion contributed

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50,075 piasters for the purchase of rice and clothing. During the month of February, 5000 BF of scrap lumber was donated. Excess food was distributed to various orphanages and potable water was provided for the Ap Ngu Phue Orphanage. During March, 335 pounds of clothing and 50 pounds of food were donated to the Honai Orphanage and a water tank and plumbing were placed for the Tan Hiep Church. During April, potable water was delivered to Honai Orphanage. More than 140 empty asphalt drums were delivered to employees living in Honai for barricades. Twelve kilometers of road and a parade field were repaired. Swings and teeter totters were built for schools in Long An Province. Approximately 18,700 BF of scrap lumber was distributed to the needy. Most of these projects were accomplished by military personnel in their off duty time.

o. Petrus Ky Refugee Camp Assistance: Thousands were left homeless in the Saigon area as a result of the TET offensive. To provide shelter, the Vietnamese Government sponsored the construction of a 1500 family housing project. Engineer assistance was furnished to set up a model prefabrication shop in Saigon. A 10 man Vietnamese prefabrication crew, one NCO and three soldiers were selected for this task. The prefabrication shop served as a model for other Vietnamese work crews while constructing prefabrication units. The crew prefabricated trusses and frames for 403 kitchen units in 10 days. The task was successful both in production and knowledge imparted to the local Vietnamese.

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Section 2. Lessons Learned: Commander's Observation, Evaluations, and Recommendations.

a. Personnel - None

b. Operations

(1) Bunker Construction.

(a) OBSERVATION. The increased need for bunkers during the TET offensive resulted in a simplified and easily erectable series of bunkers.

(b) EVALUATION. The increased bunker requirements prompted more versatile designs. The revised designs simplified fabrication and erection. Designs were reworked to produce a modular system of panels adaptable to time saving prefabrication and erection techniques. Also this resulted in a reduction in material requirements. For example bunkers may be paralleled or connected in series, reducing lumber, labor and equipment requirements. Erection procedures were simplified to permit self-help erection. Designs were revised to provide several options for revetting. For example with only minor justification the 4 man fighting bunker may be revetted by backfilling, sandbagging or using a cavity fill wall. Revetting by backfilling and using cavity walls provides a large time and man-power saving over the conventional sandbag method. Revetting by backfilling is especially adaptable to engineer construction with its earthmoving capability. Likewise cavity fill walls are easily filled by front loader with a major savings in time and man-power. The life of the cavity wall bunker and back-filled bunker greatly exceeds the life of the sandbag cover for conventional bunker.

(c) RECOMMENDATION. Bunkers should be designed using basic patterns with variations to fit the existing conditions. Maximum use of cavity walls and backfilling reduce construction time and future maintenance.

(2) Penepime as Water Proofing Preservative.

(a) OBSERVATION. Due to additional speed of construction, the use of wooden bunkers and revetments has increased in this area. Earth filled wooden framed structures afford adequate protection against small arms fire and fragments, however, because of the tropical climate and high humidity, the wood soaks up a great deal of moisture which tends to deteriorate the framing material quickly.

(b) EVALUATION. Because of the scarcity of creosote or treated wood, this unit utilized penepime, cut back at the ratio of 3 to 1 (to obtain optimum absorption) to coat both inside and outside of the wood material as a preservative and prolong the life of wood structures. This reduced the rate of absorption and the deterioration rate substantially. The preservative can be applied with hand spraying devices which are standard equipment on most asphalt distributors and heating kettles.

(c) RECOMMENDATION. Peneprime be used as a wood preservative on wooden construction, where a semi-clean finish is not required.

(3) Discharging Concrete from 34E Paving Machine.

(a) OBSERVATION. This unit has employed a 34E concrete paving machine in conjunction with a fabricated hopper and gravity flow water system as a concrete batch plant. During the past quarter it was discovered that the bull gear which drives the main bucket boom laterally had become 100% unserviceable. After a thorough search of parts stockages in the area had been made it was subsequently discovered that no replacement parts were available.

(b) EVALUATION. To remedy this problem until parts are available, this unit has removed the bucket delivery boom from the machine and has replaced it with a fabricated steel chute assembly which delivers the concrete from the mixing drum to forms or waiting transport trucks. The chute is attached to the discharge port with 1/2" mounting bolts and is braced to the upper section of the paver with an adjustable chain support.

(c) RECOMMENDATION. A prefabricated chute can be utilized in lieu of the bucket and boom assembly on a 34E paver as a means of discharging concrete from the mixing drum to trucks or forms.

(4) Waterproofing for Wooden Revetments.

(a) OBSERVATION. Water seepage inside revetments has caused laterite to wash out and lumber to decay thereby decreasing the effectiveness of the revetment. Burlap covers, even when peneprimed, have proved inadequate.

(b) EVALUATION. Covering wooden revetments with polyethylene rather than burlap proved to be a highly effective and time saving method of waterproofing. The polyethylene was installed in the same manner as burlap, but did not require penepriming.

(c) RECOMMENDATION. Use polyethylene or salvage T-17 membrane to waterproof wooden revetments.

(5) Fortification.

(a) OBSERVATION. During the increased enemy activity of the TET holiday period, secondary defensive positions in the battalion were increased. A conventional sandbag wall required the filling and stacking of numerous sandbags in a short amount of time.

(b) EVALUATION. A hasty defensive wall offering ample protection was constructed from salvaged barrels. The barrels were placed side by side with a foot spacing between them. They were filled with sand and sandbags were placed between them approximately 2½ feet high. This provided openings that could be used as gunports. Utilizing this method, complete protection was attained in a minimum amount of time.

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(c) RECOMMENDATION. For hasty perimeter fortifications, empty barrels prove to be an effective expedient and time saving substitute for sandbag walls.

- c. Training - None
- d. Intelligence - None
- e. Logistics.

### (1) Paints and Stains.

(a) OBSERVATION. Projects requiring the use of paints and stains are increasing.

(b) EVALUATION. Paints and stains are presently self service supply items and consequently are not stocked in the Engineer Construction Material Yard. The self service supply store issues these items in small quantities only, thereby necessitating numerous visits to the SSSS to pick up required quantities for construction projects.

(c) RECOMMENDATION. Paints and stains should be added to the Engineer Material Stockage list and stocked in sufficient quantity to satisfy demands.

### (2) Engine Overheating.

(a) OBSERVATION. International Harvester Engines used on the mixer of the Asphalt Plant have a tendency to overheat.

(b) EVALUATION. Considerable trouble has been encountered on the engines used on the mixers of the Asphalt Plants. New engines would only run for several days and then would suddenly overheat, resulting in bearing damage. It was found that replacing the OE-30 oil in the engine with OE-50 oil alleviated this problem.

(c) RECOMMENDATION. Engines operating in a continuously hot environment should utilize a heavier weight oil than is recommended by the manufacturer.

### (3) Letourneau Westinghouse Graders.

(a) OBSERVATION. Letourneau Westinghouse graders arrived in the command without applicable publications. When one of the graders was placed on deadline for a clutch, an experiment using clutch fingers for a five ton truck was conducted.

(b) EVALUATION. An experiment was conducted to determine if there was a suitable substitute for the grader clutch assembly in the supply system. After testing several assemblies, the clutch fingers of a 5 ton dump truck, Model M5142, were utilized successfully.

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(c) RECOMMENDATION. That appropriate manuals be issued with the equipment and that supply manuals reflect the FSN of the clutch assembly of a 5 ton as an authorized substitute.

f. Organization - None

g. Other Vietnamese Personnel.

### (1) Organization.

(a) OBSERVATION. The battalion's Vietnamese Work Force is organized similar to the construction company. It is distinct and separate from the construction battalion. One Vietnamese company is assigned to each construction company. The organization consists of squad size units integrated into Vietnamese platoons and companies. The organization is supervised by a Vietnamese chain of command. Leaders in the chain of command are Vietnamese counterparts of the company commander, platoon leaders and squad leaders. This organization has proven the most effective for command, control and training. Speciality functions such as the carpenter shop are also structured and have a distinct chain of command.

(b) EVALUATION. The Vietnamese organization is successful in training personnel since it offers advancement, eliminates much of the language barrier and establishes a supervisory element to control the training and advancement. This organization has resulted in increased productivity and decreased demands on battalion supervisory personnel. The individual worker now has a clear cut opportunity for advancement. He has eagerly accepted this opportunity. Recommendations for promotion start with the Vietnamese supervisor. This increases the supervisor's responsibility and demands higher standards of performance. The opportunity for advancement coupled with the incentive fosters a strong desire for OJT training and subsequently advancement.

(c) RECOMMENDATION. The Vietnamese Work Force be organized similar to TO&E units with its own Vietnamese leaders.

### (2) Unskilled Laborers

(a) OBSERVATION. A labor pool of unskilled laborers is of little value to an engineer construction battalion since most of the work to be done requires skilled workers, e.g. Carpenters, Masons and Plumbers.

(b) EVALUATION. The use of an unskilled work force within a construction battalion is of little or no use to the battalion. A work force composed entirely of skilled Vietnamese under a Vietnamese chain of command provides superior production, efficiency and quality. A Vietnamese platoon organized similarly to the US Army TO&E structure has shown that it could perform with equal efficiency to a GI platoon, but with slightly better quality of finish work. This is credited to the difference in experience between the young GI and the older Vietnamese.

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(c) RECOMMENDATION: All Vietnamese personnel used to augment an engineer construction battalion should be skilled personnel. Where skilled personnel are not available, unskilled personnel should be hired and trained for a particular skill in an aggressive training program.

*George B. Gray Jr*

GEORGE B. GRAY JR  
LTC, CE  
Commanding

1 Incl

~~1. Organizational Structure~~

~~2. After Action Report~~

~~3. After Action Report~~

~~4. After Action Report~~

~~5. After Action Report~~

~~6. After Action Report~~

~~7. After Action Report~~

Withdrawn, Hq DA

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EGB-3 (14 May 68) 1st Ind  
 SUBJECT: Operational Report + Lessons Learned (RCS CSFOR-45) for Quarterly  
 Period Ending 30 April 1968

DA, Headquarters, 159th Engineer Group, APO 96191, 17 May 1968

TO: SEE DISTRIBUTION

1. The subject report submitted by the 16th Engineer Battalion has been reviewed by this headquarters and is considered comprehensive and of value for documentation and review of unit activities and experience.
2. This headquarters concurs with the report, with the following comments:

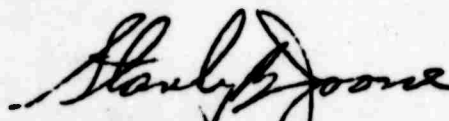
Section 1. Operations: Significant Activities

Reference paragraph 1k: The 159th Engineer Group consumes lumber in excess of 1 million board feet per month with the 16th Engineer Battalion being the principal user. The indicated sizes have not been stocked by depot in sufficient quantities to meet the demands of the engineer construction units in the area.

The 16th Engineer Battalion has one 3000 GPH water purification unit on hand. However, this unit is not mobile and is presently utilized at a fixed water point. This battalion has been without its TOE water purification units since September 1967. Employment of elements of the 16th Engineer Battalion into areas where self sustenance is necessary would create an absolute need for the 1500 GPH water purification units.

Shortage of 250 CFM air compressors and haul capability is a group wide problem. It is understood that compressors are due in country in the near future. There has been some relief in the shortage of 10 ton truck tractors, but, the problem remains serious. ITOE action is pending which would authorize one 5000 gal water tanker for each line company in a construction battalion.

FOR THE COMMANDER:



STANLEY B. JOOSSE  
 Captain, AGC  
 Adjutant

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AVHGC-DST (14 May 68) 3d Ind CPT Arnold/ms/LBN 4485  
SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for  
Quarterly Period Ending 30 April 1968

HEADQUARTERS, US ARMY VIETNAM, APO San Francisco 96375 10 JUL 1968

TO: Commander in Chief, United States Army, Pacific, ATTN: GPOP-DT,  
APO 96558

1. This headquarters has reviewed the Operational Report-Lessons Learned for the quarterly period ending 30 April 1968 from Headquarters, 46th Engineer Battalion.
2. Reference item concerning organization, page 16, paragraph g (1): Concur. USARV G-3 is presently determining more effective methods concerning the utilization of Local National structure.

FOR THE COMMANDER:

  
JOHN V. GETCHELL  
Captain, AGC  
Assistant Adjutant General

Copies furnished:  
HQ, 20th Engr Bde  
HQ, 46th Engr Bn

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27 The following items are recommended for inclusion in the Lessons Learned Index:

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\*\* FOR OT RD # \_\_\_\_\_

\*\*\*PAGE # \_\_\_\_\_

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SUBJECT TITLE \_\_\_\_\_

FOR OT RD # \_\_\_\_\_

PAGE # \_\_\_\_\_

ITEM 3

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ITEM 4

SUBJECT TITLE \_\_\_\_\_

FOR OT RD # \_\_\_\_\_

PAGE # \_\_\_\_\_

ITEM 5

SUBJECT TITLE \_\_\_\_\_

FOR OT RD # \_\_\_\_\_

PAGE # \_\_\_\_\_

\* Subject Title: A short (one sentence or phrase) description of the item of interest.

\*\* FOR OT RD # : Appears in the Reply Reference line of the Letter of Transmittal. This number must be accurately stated.

\*\*\*Page # : That page on which the item of interest is located.

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